

Replacement Claims for Amendment filed November 4, 2005
(Office Action dated October 4, 2005)

The Response to Restriction Requirement and Preliminary Amendment filed on November 4, 2005 should have submitted claims, in accordance with M.P.E.P. §§ 1451 and 1453, as follows:

In the Claims:

Please amend the claims as follows:

Claim 1 (Amended): A spark plug comprising:
a central electrode;
an insulator provided exterior to the central electrode;
a main metallic shell provided exterior to the insulator;
a ground electrode having one end coupled to the main metallic shell and [coupled to one end of the main metallic shell and having] another end facing the central electrode; and
an igniting portion secured to at least one of the central electrode and the ground electrode, and forming a spark discharge gap;
wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from over 10% to less than 30% wt%.

Claim 2 (Amended): The [A] spark plug according to claim 1, wherein the Ir-based alloy includes Rh in an amount ranging from 15 to 25 wt%.

Claim 3 (Amended): The [A] spark plug according to claim 1, wherein the Ir-based alloy includes Rh in a amount ranging from 18 to 22 wt%.

Claim 4 (Amended): [A method for producing a spark plug comprising a central electrode; an insulator provided exterior to the central electrode; a main metallic shell provided exterior to the insulator; a ground electrode having one end coupled to the main metallic shell and another end facing the central electrode; and an igniting portion secured to at least one of the central electrode and the ground electrode and forming a spark plug gap; said] The spark plug according to claim 1, produced by a method comprising the steps of:

working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to less than 30wt% at 700°C or more by hot rolling or hot forging to a wire or rod shape;
cutting the worked alloy to a chip of a specified length; and
welding and bonding the chip as the igniting portion to at least one of the central electrode and the ground electrode.

Claim 5 (Amended): [A method for producing a spark plug comprising a central electrode; an insulator provided exterior to the central electrode; a main metallic shell provided exterior to the insulator; a ground electrode having one end coupled to the main metallic shell and another end facing the central electrode; and an igniting portion secured to at least one of the central electrode and the ground electrode and forming a spark plug gap; said] The spark plug according to claim 1, produced by a method comprising the steps of:

working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to less than 30wt% at 700°C or more by hot rolling to a sheet;
hot blanking the sheet to a chip of a specified shape; and

welding and bonding the chip as the igniting portion to at least one of the central electrode and the ground electrode.

Claim 6 (Amended): [A method for producing a spark plug comprising a central electrode; an insulator provided exterior to the central electrode; a main metallic shell provided exterior to the insulator; a ground electrode having one end coupled to the main metallic shell and another end facing the central electrode; and an igniting portion secured to at least one of the central electrode and the ground electrode and forming a spark plug gap; said] The spark plug according to claim 1, produced by a method comprising the steps of:

placing a chip including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% on a tip end face of the central electrode comprising Ni alloy; and

forming an annular welding portion laid across the chip and the central electrode, so as to form the igniting portion including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt%.

Claim 7 (Amended): [A method for producing a spark plug comprising a central electrode; an insulator provided exterior to the central electrode; a main metallic shell provided exterior to the insulator; a ground electrode having one end coupled to the main metallic shell and another end facing the central electrode; and an igniting portion secured to at least one of the central electrode and the ground electrode and forming a spark plug gap; said] The spark plug according to claim 1, produced by a method comprising the steps of:

placing a chip including an Ir-based alloy including Rh in an amount ranging from 10wt% to 25wt% on a tip end face of the central electrode comprising Ni alloy; and

forming an annular welding portion laid across the chip and the central electrode, so as to form the igniting portion including an Ir-based alloy including Rh in an amount ranging from 10wt% to 25wt%.

Claim 8 (Amended): The spark plug according to claim 6, [The method for producing a spark plug according to claim 6,] wherein the welding portion is exposed to an outer periphery of the chip, and is not exposed to the tip end face of the chip.

Claim 9 (Amended): The spark plug according to claim 7, [The method for producing a spark plug according to claims 7,] wherein the welding portion is exposed to an outer periphery of the chip, and is not exposed to the tip end face of the chip.

Claim 10 (Amended): The spark plug according to claim 6, [The method for producing a spark plug according to claim 6,] wherein a taper portion is formed at a tip end side of the central electrode, and the chip is bonded to the tip end face of the taper portion so as to form the igniting portion.

Claim 11 (Amended): The spark plug according to claim 7, [The method for producing a spark plug according to claim 7,] wherein a taper portion is formed at a tip end side of the central electrode, and the chip is bonded to the tip end face of the taper portion so as to form the igniting portion.

Claim 12 (Amended): The spark plug according to claim 10, [The method for producing a spark plug according to claim 10,] wherein the central electrode is arranged such that the whole of the taper portion protrudes from an outside of an opening edge of a through hole of the insulator, the central electrode being inserted into the through hole.

Claim 13 (Amended): The spark plug according to claim 11, [The method for producing a spark plug according to claim 11,] wherein the central electrode is arranged such that the whole of the taper portion protrudes from an outside of an opening edge of a through hole of the insulator, the central electrode being inserted into the through hole.

Claim 14 (Amended): The spark plug according to claim 6, [The method for producing a spark plug according to claim 6,] wherein the chip is produced by working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% at 700°C or more by hot rolling or hot forging to a wire or rod shape, and thereafter, cutting the worked alloy to a specified length in a longitudinal direction.

Claim 15 (Amended): The spark plug according to claim 7, [The method for producing a spark plug according to claim 7,] wherein the chip is produced by working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% at 700°C or more by hot rolling or hot forging to a wire or rod shape, and thereafter, cutting the worked alloy to a specified length in a longitudinal direction.

Claim 16 (Amended): The spark plug according to claim 6, [The method for producing a spark plug according to claim 6,] wherein the chip is produced by working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% at 700°C or more by hot rolling to a sheet, hot blanking the sheet to a chip of a specified shape, and welding and bonding the chip.

Claim 17 (Amended): The spark plug according to claim 7, [The method for producing a spark plug according to claim 7,] wherein the chip is produced by working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% at 700°C or more by hot rolling to a sheet, hot blanking the sheet to a chip of a specified shape, and welding and bonding the chip.

Claim 18 (Amended): The spark plug according to claim 4, [The method for producing a spark plug according to claim 4,] wherein the igniting portion including an Ir-based alloy including Rh in an amount ranging from 15wt% to less than 25wt%.

Claim 19 (Amended): The spark plug according to claim 5, [The method for producing a spark plug according to claim 5,] wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 15wt% to less than 25wt%.

Claim 20 (Amended): The spark plug according to claim 6, [The method for producing a spark plug according to claim 6,] wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 15wt% to less than 25wt%.

Claim 21 (Amended): The spark plug according to claim 7, [The method for producing a spark plug according to claim 7,] wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 15wt% to less than 25wt%.

Claim 22 (Amended): The spark plug according to claim 18, [The method for producing a spark plug according to claim 18,] wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 18wt% to less than 22wt%.

Claim 23 (Amended): The spark plug according to claim 19, [The method for producing a spark plug according to claim 19,] wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 18wt% to less than 22wt%.

Claim 24 (Amended): The spark plug according to claim 20, [The method for producing a spark plug according to claim 20,] wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 18wt% to less than 22wt%.

Claim 25 (Amended): The spark plug according to claim 21, [The method for producing a spark plug according to claim 21,] wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 18wt% to less than 22wt%.

Claim 26. A spark plug comprising a central electrode; an insulator provided exterior to the central electrode; a main metallic shell provided exterior to the insulator; a ground electrode having one end coupled to the main metallic shell and another end facing the central electrode;

and an igniting portion secured to at least one of the central electrode and the ground electrode and forming a spark plug gap;

wherein a chip including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% is placed on a tip end face of the central electrode comprising Ni alloy; and

an annular welding portion laid across the chip and the central electrode is formed so as to form the igniting portion including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt%.

Claim 27. A spark plug comprising a central electrode; an insulator provided exterior to the central electrode; a main metallic shell provided exterior to the insulator; a ground electrode having one end coupled to the main metallic shell and another end facing the central electrode; and an igniting portion secured to at least one of the central electrode and the ground electrode and forming a spark plug gap;

wherein a chip including an Ir-based alloy including Rh in an amount ranging from 10wt% to 25wt% is placed on a tip end face of the central electrode comprising Ni alloy; and

an annular welding portion laid across the chip and the central electrode is formed so as to form the igniting portion including an Ir-based alloy including Rh in an amount ranging from 10wt% to 25wt%.

Claim 28. The spark plug according to claim 26, wherein the welding portion is exposed to an outer periphery of the chip, and is not exposed to the tip end face of the chip.

Claim 29. The spark plug according to claim 27, wherein the welding portion is exposed to an outer periphery of the chip, and is not exposed to the tip end face of the chip.

Claim 30. The spark plug according to claim 26, wherein a taper portion is formed at a tip end side of the central electrode, and the chip is bonded to the tip end face of the taper portion so as to form the igniting portion.

Claim 31. The spark plug according to claim 27, wherein a taper portion is formed at the tip end side of the central electrode, and the chip is bonded to the tip end face of the taper portion so as to form the igniting portion.

Claim 32. The spark plug according to claim 30, wherein the central electrode is arranged such that the whole of the taper portion protrudes from an outside of an opening edge of a through hole of the insulator, the central electrode being inserted into the through hole.

Claim 33. The spark plug according to claim 31, wherein the central electrode is arranged such that the whole of the taper portion protrudes from an outside of an opening edge of a through hole of the insulator, the central electrode being inserted into the through hole.

Claim 34. The spark plug according to claim 26, wherein the chip is produced by working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% at 700°C or more by hot rolling or hot forging to a wire or rod shape, and thereafter, cutting the worked alloy to a specified length in a longitudinal direction.

Claim 35. The spark plug according to claim 27, wherein the chip is produced by working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to

10wt% at 700°C or more by hot rolling or hot forging to a wire or rod shape, and thereafter, cutting the worked alloy to a specified length in a longitudinal direction.

Claim 36. The spark plug according to claim 26, wherein the chip is produced by working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% at 700°C or more by hot rolling to a sheet, hot blanking the sheet to a chip of a specified shape, and welding and bonding the chip.

Claim 37. The spark plug according to claim 27, wherein the chip is produced by working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% at 700°C or more by hot rolling to a sheet, hot blanking the sheet to a chip of a specified shape, and welding and bonding the chip.

Claim 38. The spark plug according to claim 26, wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 15wt% to less than 25wt%.

Claim 39. The spark plug according to claim 27, wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 15wt% to less than 25wt%.

Claim 40. The spark plug according to claim 38, wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 18wt% to less than 22wt%.

Claim 41. The spark plug according to claim 39, wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 18wt% to less than 22wt%.

Claim 42. A spark plug comprising:
a central electrode;
an insulator provided exterior to the central electrode;
a main metallic shell provided exterior to the insulator;
a ground electrode coupled to one end of the main metallic shell and having another end
facing the central electrode; and
an igniting portion secured to at least one of the central electrode and the ground electrode,
and forming a spark discharge gap;
wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging
from over 10% to less than 30% wt%.

Claim 43. A spark plug according to claim 42, wherein the Ir-based alloy includes Rh in an
amount ranging from 15 to 25 wt%.

Claim 44. A spark plug according to claim 42, wherein the Ir-based alloy includes Rh in a
amount ranging from 18 to 22 wt%.

In the Preliminary Amendment that was filed on November 4, 2005 new claims 4-25 were amended. Since the presentation of the amended claims do not contain any indication of what is changed from the previous version of the claim, pursuant to M.P.E.P § 1453, Applicants are required to point out what is changed in the "Remarks" portion of the amendment. The additional remarks include:

Claims 1-44 are pending. Claims 4-25 are amended to depend from independent claim 1.

Independent claims 4-7 are amended to have their preamble changed to “[t]he spark plug according to claim 1, produced by a.”

Dependent claims 8, 10, 14, 16, and 20 are amended to have their preamble changed to “[t]he spark plug according to claim 6.”

Dependent claims 9, 11, 13, 15, 17, and 21 are amended to have their preamble changed to “[t]he spark plug according to claim 7.”

Dependent claim 12 is amended to have its preamble changed to “[t]he spark plug according to claim 10.”

Dependent claim 18 is amended to have its preamble changed to “[t]he spark plug according to claim 4.”

Dependent claim 19 is amended to have its preamble changed to “[t]he spark plug

according to claim 5.”

Dependent claim 22 is amended to have its preamble changed to “[t]he spark plug according to claim 18.”

Dependent claim 23 is amended to have its preamble changed to “[t]he spark plug according to claim 19.”

Dependent claim 24 is amended to have its preamble changed to “[t]he spark plug according to claim 20.”

And finally, dependent claim 25 is amended to have its preamble changed to “[t]he spark plug according to claim 21.”

The changes to the preambles are not substantive and, therefore, an explanation of the support in the disclosure of the patent regarding these changes as required by 37 C.F.R. § 1.173(c) is not necessary.

Replacement Claims for Amendment filed June 29, 2006
(Office Action dated April 3, 2006)

The Amendment filed on June 29, 2006 in response to the Office Action that was issued on April 3, 2006 should have submitted claims, in accordance with M.P.E.P. §§ 1451 and 1453, as follows:

In the Claims:

Please amend the claims as follows:

Cancel claims 1 through 25.

Claim 26. A spark plug comprising a central electrode; an insulator provided exterior to the central electrode; a main metallic shell provided exterior to the insulator; a ground electrode having one end coupled to the main metallic shell and another end facing the central electrode; and an igniting portion secured to at least one of the central electrode and the ground electrode and forming a spark plug gap;

wherein a chip including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% is placed on a tip end face of the central electrode comprising Ni alloy; and

an annular welding portion laid across the chip and the central electrode is formed so as to form the igniting portion including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt%.

Claim 27. A spark plug comprising a central electrode; an insulator provided exterior to the central electrode; a main metallic shell provided exterior to the insulator; a ground electrode having one end coupled to the main metallic shell and another end facing the central electrode; and an igniting portion secured to at least one of the central electrode and the ground electrode and forming a spark plug gap;

wherein a chip including an Ir-based alloy including Rh in an amount ranging from 10wt% to 25wt% is placed on a tip end face of the central electrode comprising Ni alloy; and

an annular welding portion laid across the chip and the central electrode is formed so as to form the igniting portion including an Ir-based alloy including Rh in an amount ranging from 10wt% to 25wt%.

Claim 28. The spark plug according to claim 26, wherein the welding portion is exposed to an outer periphery of the chip, and is not exposed to the tip end face of the chip.

Claim 29. The spark plug according to claim 27, wherein the welding portion is exposed to an outer periphery of the chip, and is not exposed to the tip end face of the chip.

Claim 30. The spark plug according to claim 26, wherein a taper portion is formed at a tip end side of the central electrode, and the chip is bonded to the tip end face of the taper portion so as to form the igniting portion.

Claim 31. The spark plug according to claim 27, wherein a taper portion is formed at the tip end side of the central electrode, and the chip is bonded to the tip end face of the taper portion so as to form the igniting portion.

Claim 32. The spark plug according to claim 30, wherein the central electrode is arranged such that the whole of the taper portion protrudes from an outside of an opening edge of a through hole of the insulator, the central electrode being inserted into the through hole.

Claim 33. The spark plug according to claim 31, wherein the central electrode is arranged such that the whole of the taper portion protrudes from an outside of an opening edge of a through hole of the insulator, the central electrode being inserted into the through hole.

Claim 34. The spark plug according to claim 26, wherein the chip is produced by working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% at 700°C or more by hot rolling or hot forging to a wire or rod shape, and thereafter, cutting the worked alloy to a specified length in a longitudinal direction.

Claim 35. The spark plug according to claim 27, wherein the chip is produced by working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% at 700°C or more by hot rolling or hot forging to a wire or rod shape, and thereafter, cutting the worked alloy to a specified length in a longitudinal direction.

Claim 36. The spark plug according to claim 26, wherein the chip is produced by working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% at 700°C or more by hot rolling to a sheet, hot blanking the sheet to a chip of a specified shape, and welding and bonding the chip.

Claim 37. The spark plug according to claim 27, wherein the chip is produced by working a molten alloy including an Ir-based alloy including Rh in an amount ranging from 7wt% to 10wt% at 700°C or more by hot rolling to a sheet, hot blanking the sheet to a chip of a specified shape, and welding and bonding the chip.

Claim 38. The spark plug according to claim 26, wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 15wt% to less than 25wt%.

Claim 39. The spark plug according to claim 27, wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 15wt% to less than 25wt%.

Claim 40. The spark plug according to claim 38, wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 18wt% to less than 22wt%.

Claim 41. The spark plug according to claim 39, wherein the igniting portion includes an Ir-based alloy including Rh in an amount ranging from 18wt% to less than 22wt%.

Cancel claims 42 through 44.

Conclusion

The Replacement Claims are being filed in proper reissue format as requested by the Examiner. The content of the claims are the same as those in the original Responses.

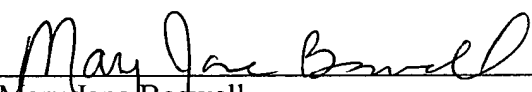
If there are any other fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-0310. If a fee is required for an extension of time under 37 C.F.R. § 136 not accounted for above, such extension is requested and the fee should also be charged to our Deposit Account.

Respectfully submitted,

MORGAN, LEWIS & BOCKIUS LLP

Dated: July 21, 2006

By:


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